Knowledge and attitudes towards HIV/AIDS among secondary school students in Aden /Yemen

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Abstract

Background: Human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) remain significant global public health challenges. As infection rates continue to rise worldwide, evaluating awareness and perceptions of these conditions—especially among adolescents and young adults—is essential for effective prevention strategies. This research focuses on examining HIV/AIDS-related knowledge and attitudes among high school students, a key demographic for targeted health education interventions.

Materials and Methods: A cross-sectional survey was carried out involving a sample of 312 secondary school students selected from four randomly chosen schools in Aden governorate, Yemen. A standardized, researcher-developed questionnaire was utilized to evaluate the participants' knowledge and perceptions regarding HIV/AIDS. The data collection was conducted in a classroom setting to ensure high response rates and uniformity in the administration of the survey instruments.

Results: Overall, the students demonstrated satisfactory general knowledge of HIV/AIDS, including an understanding of its modes of transmission. However, misconception present about other modes of transmission and prevention. The students identified social media (81.7%) as their important source of information about AIDS. Near 70% stated that they would not buy vegetables from a vegetable seller with AIDS, and 60.9% disagree to share the class with HIV infected student.

Conclusion: The investigation established that secondary school adolescents display adequate baseline awareness of HIV/AIDS concepts, yet concerning inaccuracies persist specifically relating to disease transmission pathways and scientifically established prophylactic methods

Key words: HIV/AIDS, adolescents, Secondary school, knowledge, attitudes, Aden, Yemen.

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المعرفة والمواقف تجاه فيروس نقص المناعة البشرية/الايدز بين طلاب مدارس الثانوية في عدن/اليمن

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الملخص:

الخلفية: فيروس نقص المناعة البشرية (HIV) ومتلازمة نقص المناعة المكتسب (AIDS) يشكلان تحديات صحية عامة عالمية كبيرة. ومع استمرار ارتفاع معدلات الإصابة عالميًا، يُعد تقييم الوعي والتصورات حول هذه الحالات — خاصة بين المراهقين والشباب — أمرًا بالغ الأهمية لاستراتيجيات الوقاية الفعالة. تركز هذه الدراسة على فحص المعرفة والمواقف المتعلقة بفيروس نقص المناعة البشرية/الإيدز بين طلاب المدارس الثانوية، وهي فئة ديموغرافية رئيسية تستهدفها تدخلات التوعية الصحية.

المنهجية: اجريت دراسة استقصائية مستعرضة على عينة تتكون من 312 طالب وطالبة من أربع مدارس ثانوية مختارة عشوائياً في محافظة عدن / اليمن باستخدام استبيان صمم لقياس المعرفة تجاه الايدز والمواقف للطلاب. في حيت ثم توزيع الاستبيان على الطلاب في فصولهم.

النتائج: بشكل عام تبين ان لدى الطلاب معرفة جيدة بشان فيروس نقص المناعة البشرية /الايدز وطرق وانتقاله إلا ان هناك مفاهيم خاطئة حول بعض طرق الانتقال والإجراءات الوقائية. وقد اشار الطلاب الى ان وسائل التواصل الاجتماعي (81.7%) هي مصدر مهم للمعلومات حول الايدز. كما اظهرت النتائج ان الفروق كانت ذات دلالة احصائية بين الجنسين حيث تمتع الإناث بمعرفة أفضل من الذكور ($P<0.05$). وما يقرب من 70% من الطلاب صرح بعدم الشراء من بائع الخضار مصاب بالايدز و 60.9% أبدو عدم موافقتهم على مشاركة الصف مع طالب مصاب بفيروس نقص المناعة البشرية /الايدز.

الاستنتاج: اظهرت هذه الدراسة كشفت الدراسة أن المراهقين في المدارس الثانوية يظهرون وعيًا أساسيًا كافيًا بمفاهيم فيروس نقص المناعة البشرية/الإيدز، إلا أن هناك أخطاء مقلقة لا تزال قائمة، خاصة فيما يتعلق بمسارات انتقال المرض والطرق الوقائية المثبتة علميًا

الكلمات المفتاحية: فيروس نقص المناعة البشرية /الايدز، المراهقين، المدارس الثانوية، المعرفة، المواقف، عدن/اليمن.

Introduction:

The global health landscape continues to grapple with the profound impact of HIV-induced immunodeficiency, with AIDS representing the terminal stage of this chronic viral infection. Mortality metrics paint a sobering picture, with an estimated forty million cumulative deaths attributed to this disease complex since its initial identification. Epidemiological surveillance indicates persistently high transmission rates, with 2021 global estimates suggesting nearly thirty-nine million individuals were living with the retroviral infection. That same year witnessed over one million new HIV acquisitions alongside six hundred fifty thousand mortality events directly attributable to AIDS-related complications (1). Of particular concern is the rising burden of HIV among younger populations, as approximately 410,000 new infections occurred in individuals aged 10-24, including 160,000 cases among aged 10-19 (2). This trend underscores the increasing vulnerability of younger populations to HIV infection.

Demographic and Health Survey data from multiple countries indicate that adolescents are experiencing puberty at earlier ages compared to previous generations. Consequently, many engage in sexual activity at a younger age, often without adequate knowledge or access to preventive measures. These sexual encounters are frequently unprotected, unplanned, and associated with increased risks of unintended pregnancies, induced abortions, and sexually transmitted infections (3).

Numerous studies have identified various factors associated with HIV transmission, including unawareness of one's HIV status, insufficient disease-related knowledge, low educational levels, socioeconomic disadvantages, limited access to antiretroviral therapy, suboptimal adherence to treatment regimens, inadequate HIV education and counseling services in clinical settings, geographic location, exposure to mass media, prior receipt of HIV/AIDS education, and a lack of previous HIV testing (4–12). Moreover, the spread of HIV within communities is closely linked to societal attitudes toward sexuality and prevailing sexual practices. A key driver of the epidemic in developing countries is the widespread lack of knowledge regarding modes of transmission and effective prevention strategies (3).

Although Yemen is categorized among the least developed countries, it continues to report a relatively low national prevalence of HIV. According to surveillance data from Transmitted Diseases Control Program, the documented HIV incidence in 2024 remained exceptionally low at 0.02 per 100,000 population (15). However, emerging epidemiological patterns indicate a concerning trend of localized HIV transmission clusters, particularly evident in sexual minority populations (16).

Assessing the knowledge, attitudes, and sexual practices of secondary school students is of critical importance, as this demographic undergoes significant developmental, psychological, social, and structural changes that may increase their susceptibility to HIV infection (17).

Effective development of sexual health interventions requires comprehensive baseline assessment of existing HIV/STD awareness, beliefs, and behaviors within target populations. Youth constitute a particularly crucial group for implementing evidence-based prevention programs to curb HIV transmission and associated fatalities. In Aden, Yemen, research examining HIV awareness remains extremely limited, with only a single published investigation focusing on dental undergraduates (18). Despite the recognized importance of adolescent health education, a significant research gap persists regarding HIV awareness among Yemeni secondary school populations. This investigation represents the first systematic inquiry into HIV-related knowledge, perceptions, and behaviors among high school students in selected districts of Aden governorate.

Subjects and methods:

Study design

This cross-sectional investigation was conducted during March 2024 among adolescent learners attending public secondary schools in Aden, Yemen. A standardized, self-reported questionnaire instrument was employed to systematically evaluate participants' HIV/AIDS prevention awareness, perceptions, and behavioral patterns.

Study Population

The research cohort consisted of adolescent learners enrolled in secondary schools across Aden Governorate, Yemen, convenience sample 312 registered students, out of them 153 in the first and 159 second year. The four schools that participated in this study were equally distributed between Al-Mansora district (Khadija school for girls, Al-Noa,aman for boys); and Al-Shaab district (Al-Majma school for girls, Al-Quds school for boys).

Questionnaire

The research team developed a comprehensive 40-item survey instrument organized into six thematic domains. The questionnaire design incorporated conceptual frameworks from the WHO's 1988 AIDS Programme guidelines for assessing knowledge, attitudes, beliefs, and behavioral patterns (19), supplemented by contemporary literature in the field (20,21).

Data acquisition employed a streamlined, standardized self-report questionnaire administered by trained researchers. Prior to administration, all participants provided verbal informed consent following a detailed explanation of study protocols.

Pilot Study

A pilot test was conducted with 20 students who were not included in the main study but attended the same schools. Overall the pilot study showed that no major changes in structure or content of the questionnaire were needed.

Statistical analysis

Quantitative analysis was performed using the Statistical Package for the Social Sciences (v.16.0). We employed descriptive statistical methods to characterize HIV/AIDS-related knowledge, attitudes, and behavioral patterns in the study cohort.

Ethical approval

This investigation received formal ethical clearance from the Institutional Review Board of Aden University's Faculty of Medicine and Health Sciences (Research and Postgraduate Studies Committee).

All collected information was maintained under stringent confidentiality safeguards, with access restricted to the research team. Data utilization was strictly limited to the specified academic objectives of this study.

Results:

Student's profile

A total of 312 participants enrolled into the study, of them 53.8% were males, and 46.2% were females. The median age of the participants was 17 and IQR between 14-20 years. The baseline sociodemographic profile of the study cohort is presented in Table 1, detailing key participant characteristics including age, gender, and educational background.

Table 1. Sociodemographic characteristics of the study participants (n=312)

Characteristics	Number	Percentage
Gender		
Males	168	53.8
Females	144	46.2
Age (Years)		
<17	138	44.2
≥17	174	55.8
Educational level		
First year	153	49
Second year	159	51

Knowledge about HIV/AIDS

The quantitative analysis demonstrated substantial awareness among participants regarding fundamental HIV/AIDS concepts, 77.9% answered that the disease is a contagious disease, and 73.1% said that the immunity is low to other diseases; while more than half of them thought that HIV infection and AIDS usually show symptoms (Table 2).

Participant knowledge varied significantly by transmission route: sexual (84.3%), blood products (donation 65.7%, transfusion 64.7%), and misconceptions about casual contact (47.6%), needles (49.0%), and childbirth (54.5%).

The analysis revealed substantial misconceptions regarding iatrogenic transmission, with 86.2% unaware of potential HIV spread through contaminated dental instruments. Similarly, 83.7% erroneously believed sharing eating utensils could transmit HIV. However, participants demonstrated better understanding of non-transmission routes: 93.6% correctly rejected tear-based transmission, 84% dismissed casual physical contact (hugging/handshaking) as risky, and 83.7% properly discounted nasal secretions as transmission vectors (Table 3).

While 81.4% valued health education and 70.8% knew ART prevents mother-to-child transmission, misconceptions persisted regarding ART's curative potential (60.3%) and vaccine availability (59%). Only 51.6-58.3% recognized condom use (51.6%) or marital fidelity (58.3%) as effective prevention (Table 4).

Sources of information about HIV/AIDS

The majority of participants (81.7%) reported that the internet and social media served as their primary sources of information about HIV and AIDS. Furthermore, 61.2% indicated that they had received information from healthcare professionals. Nearly half of the respondents (58.0%) received information through school-based education, while 29.8%, 21.6%, and 19.6% reported television, magazines, and newspapers as sources, respectively. Radio played a minimal role, with only 7.1% of participants citing it as a source of information (Table 5).

Attitudes toward HIV/AIDS

The study revealed that less than half of respondents (45.8%) reported being comfortable providing care for an HIV-positive family member, indicating persistent stigma surrounding the disease, while only 38.8% would agree to contact with their friends. Stigmatizing attitudes toward PLWHA (People Living with HIV/AIDS) were prevalent, with 70.3% of respondents demonstrating discriminatory dispositions in survey responses, as evidenced by their reluctance to purchase vegetables from an infected vendor. Similarly, 60.9% indicated they would not accept a student with HIV attending the same school (Table 6).

Table 2: Distribution of the participants according to general knowledge about HIV/AIDs

Knowledge items	Correct answer	Yes n (%)	No n (%)	Don't know n (%)
Cause of AIDS				
Virus Bacteria Hereditary disease	True False False	232 (74.4) 62 (19.9) 18 (5.8)	80 (25.6) 250 (80.1) 294 (94.2)	
* P 0.000				
AIDS is a contagious disease	True	243 (77.9)	37 (11.9)	32 (10.3)
* P 0.038				
An individual infected with HIV may not always exhibit visible symptoms of the disease	False	179 (57.4)	27 (8.7)	106 (34)
Individuals with AIDS typically exhibit reduced resistance to other diseases.	True	228 (73.1)	58 (18.6)	26 (8.3)
* P 0.008				
*Chi-Square test: Female participants demonstrated higher levels of knowledge compared to their male counterparts.				

Table 3: The participant's knowledge on HIV/AIDS transmission

Knowledge items	Correct answer	Yes N (%)	No N (%)
Can HIV be transmitted by using public toilets or swimming pools with an infected person?	False	118 (37.9)	193 (62)
Can HIV/AIDS be transmitted through touching, hugging, or shaking hands with an infected person?	False	50 (16)	262 (84)
* P 0.000			
Can HIV/AIDS be transmitted by sharing utensils or personal items with an infected person?	False	261 (83.7)	51 (16.3)
Can HIV/AIDS be transmitted through coughing or spitting from an infected person?	False	148 (47.6)	164 (52.4)
* P 0.002			
The utilization of disinfected equipment for tattooing and cupping is recommended among people living with AIDS.	True	153 (49)	159 (51)
Through bites of a mosquito	False	114 (36.5)	198 (63.5)
* P 0.01			
Having a tooth extracted with contaminated instrument of an infected person	True	43 (13.8)	269 (86.2)
Is it possible for a child born to an HIV-positive mother to develop AIDS?	True	170 (54.5)	142 (45.5)
Transplantation of organs or tissues from an infected individual to another person.	True	205 (65.7)	107 (34.3)
HIV can be spread through sexual contact?	True	263 (84.3)	49 (15.7)
* P 0.000			
Exposure to blood obtained from an infected donor.	True	202 (64.7)	110 (35.3)
* P 0.02			
Through contact with mucus or nasal fluid of an infected person.	False	51 (16.3)	261 (83.7)
The risk of HIV passing from mother to baby through breast milk.	True	123 (39.4)	189 (60.6)
* P 0.04			
The tears of an infected person	False	20 (6.4)	292 (93.6)
* Chi-Square test indicated that female participants had significantly higher knowledge levels compared to males			

Table 4: Participants' knowledge regarding the prevention and control of HIV/AIDS

Knowledge items	Correct answer	Yes n (%)	No n (%)
Is spreading awareness about AIDS considered one of the methods of prevention?	True	254 (81.4)	58 (18.6)
* P 0.000			
Does vaccination protect individuals from getting HIV?	False	184 (59)	128 (41)
Does using condom reduce the risk of contracting AIDS?	True	161 (51.6)	151 (48.4)
**P 0.000			
Can antiretroviral therapy (ART) prevent mother-to-child transmission of the virus?	True	221 (70.8)	91 (29.2)
Does treating other sexually transmitting diseases (STIs) decrease the chance of getting HIV?	True	194 (62.2)	118 (37.8)
Does ART drugs can cure AIDS?	False	188 (60.3)	124 (39.7)
Does ART for health worker decrease the chance of transmission?	True	206 (66)	106 (34)
Does male circumcision protect against HIV infection?	True	171 (54.8)	141 (45.2)
** P 0.000			
Can HIV spread controlled by avoiding illegal relation?	True	182 (58.3)	130 (41.7)
Chi-Square test: * Female respondents were found to be more knowledgeable, ** Male respondents were found to be more knowledgeable			

Table 5: The participant's source of information about HIV/AIDS

Source of information	Number	Percentage
Television	93	29.8
Radio	22	7.1
Newspaper	61	19.6
Magazine	67	21.6
School	181	58
Friends	68	21.8
Doctors	191	61.2
Nurses	103	33
Internet or social media	255	81.7

Table 6: Distribution of participants according to their attitudes towards HIV/AIDS

Attitudes to persons with HIV/AIDS	Agree n (%)	Disagree n (%)	Neither agree nor disagree n (%)
Would you be prepared to care for an HIV-positive family member if needed?	143 (45.8)	101 (32.4)	68 (21.8)
Would you support the continued enrollment of a student living with AIDS in your school?	102 (32.7)	190 (60.9)	20 (6.4)
Do you contact with friends with AIDS like any other person?	121 (38.8)	95 (30.4)	96 (30.7)
Would you continue to buy vegetables from vegetable seller who you know has AIDS?	56 (18)	219 (70.3)	37 (11.7)
Chi-Square analysis revealed no statistically significant gender-based differences in HIV/AIDS-related attitudes ($p > 0.05$), indicating comparable perspectives between male and female students.			

Discussion:

This epidemiological study quantified HIV/AIDS knowledge gaps and stigma patterns within Yemen's secondary school students, with particular emphasis on their understanding, perceptions, and related behaviors. The results indicated that a substantial proportion of participants were aware that AIDS a viral infection (74.3%) and acknowledged its contagious nature (77.9%). These outcomes align with those reported in previous investigations carried out in Iraq and China (22, 23).

The majority (84.3 %) rightly know that it was true that person can get AIDS through sexual intercourse and 64.7% know that donation and receiving infected blood can transmit the infection. Most of the participants (93.6%) agree that the infection cannot spread by the tears of an infected persons, by hugging, holding and shaking hands (84%) or through contact with mucus or nasal fluid of an infected person (83.7%).

Nonetheless, misconceptions were evident concerning certain modes of transmission, nearly 50% of participants identified three potential transmission routes: cough exposure (47.6%), tattoo needle-sharing (49%), and vertical mother-to-child delivery transmission (54.5%) Also, regarding modes of transmission, 83.7% thought that transmission can occur by sharing plate of HIV infected person, and mosquito bite (63.5%) could transmit the disease. Studies by Abdulsada *et al.* in Iraq and Thakuri *et al.* in India also reported analogous findings (22,24).

Concerning protective measures against AIDS, just over half of the participants (51.6%) correctly understood that condom use as an effective for preventing HIV/AIDS and additional sexually transmitted infections.

Additionally, 59% of respondents believed that a vaccine for HIV/AIDS exists. These outcomes correspond with the findings of Thakuri *et al.* and Akello *et al.* (24,25)

Only 58.3% of participants correctly identified avoiding illegal sexual relations as a means of controlling HIV/AIDS spread, a finding comparable to a study in Iraq that emphasized the preventive role of avoiding extramarital sexual contact in reducing STD transmission (19,22).

In general, awareness of HIV transmission pathways varied, with high knowledge observed for some factors and relatively limited understanding noted for others. Based on the students' answers, statistical analysis revealed a significant gender disparity in HIV/AIDS transmission knowledge ($p \leq 0.05$), with female students demonstrating superior understanding compared to their male counterparts. These findings align with previous research by Tavooosi *et al.* (26) and Kahdoei *et al.* (27).

In contrast, Shamu et al. and Malik et al. noted that males had better knowledge of HIV than females (28,29). The authors attributed this difference to the perception that boys feel more comfortable and have greater freedom to discuss issues related to sex and HIV than girls.

In this study, social media (Internet and WhatsApp) was the leading source of HIV/AIDS knowledge among students (81.7%), which corresponds with findings pf studies conducted in Iran (2024), in Kyrgyzstan (2024), and China (2024) (27,30,31). These results differ from those of a study carried out in Yemen by Al-Rabeei *et al.* (2012), which confirmed mass media as the dominant HIV/AIDS information source (32).

This trend may reflect the effectiveness of social media in spreading awareness about HIV/AIDS through diverse content like music, news, and films in recent years. This may be attributed to the significant role of media in educating the public and disseminating accurate information, thereby dispelling existing misconceptions about HIV/AIDS. Overall, these findings suggest that media should adopt innovative approaches to HIV/AIDS education to further enhance public awareness. Healthcare workers and schools were identified as the second and third most frequently cited sources of HIV/AIDS information, with 61.2% and 58% of participants, respectively, reporting these as their sources of knowledge.

The current findings of this study congruence with those of Fana (2021) South African study, who found that teachers and healthcare professionals served as primary sources of knowledge about HIV/AIDS (33). Similar patterns were observed in research conducted by Kassie *et al.* in Ethiopia (34).

In terms of attitudes toward individuals living with HIV, only 45.8% of respondents demonstrated a positive disposition by expressing willingness to care for an HIV-positive relative. Furthermore, 38.8% indicated they would maintain a friendship with a person living with HIV. This finding are dissimilar to study conducting in Greece, where the majority of respondent express that they continue having contact with relative or a friend (35).

However, the results also pointed to the negative attitude, approximately 60% opposing the continuation of education for HIV-positive students in their schools. This discriminatory attitude aligns with previous research by Akello *et al.* (25) and Tavooosi *et al.* (26). Furthermore, in our survey, 70.3% of students disagree to continue buying groceries with HIV positive individual. A comparable attitude was observed in the study by Alhasawi *et al.* (36) conducted in Kuwait, in which 74.6% of participants expressed reluctance to buy vegetables from an HIV-vendor. In the study conducted by Fana *et al.*, 52% of the respondents indicated a willingness to continue buying groceries from someone who was HIV positive (33).

Negative perceptions of individuals with HIV/AIDS can contribute to a stigmatizing environment, with serious implications for the well-being and social integration of affected individuals. Therefore, there is a critical need to foster positive attitudes centered on care, support, and non-discrimination toward people living with the disease.

This study's results can guide policymakers in creating improved educational programs to prevent HIV and encourage more positive attitudes among students.

Limitation

A key limitation of the present study is the limited sample size, potentially affecting the extent to which the findings can be generalized beyond the studied population. Ideally, a larger and more diverse sample would have provided more comprehensive understanding of the topic. Furthermore, as the data were self-reported, there is a potential for social desirability bias, particularly in a conservative and religious context such as Yemen. Constraints on discussing sensitive topics, including sexual behavior, may have limited depth and accuracy of the information obtained.

Conclusions:

Although the majority of students exhibited a generally adequate level of knowledge about HIV/AIDS, misconceptions regarding modes of transmission, as well as prevention and control strategies, were still evident. Participants demonstrated mixed attitudes toward people living with HIV (PLHIV). While positive attitudes were observed on certain issues, a notable proportion expressed stigmatizing views, such as the belief that students living with HIV should not be permitted to attend school. Overall, this study underscores the interplay between HIV/AIDS knowledge levels and attitudes among secondary school students, demonstrating the necessity for tailored educational programs that simultaneously correct misinformation and foster social inclusion.

Recommendations:

It is recommended that comprehensive HIV/AIDS education be incorporated into the secondary school curriculum to improve students' understanding of transmission routes and prevention strategies, as well as to foster more positive and inclusive attitudes toward individuals living with the condition. Future research should focus on identifying and addressing widespread misconceptions about HIV/AIDS within the broader population, with particular attention to societal attitudes, practices related to the care, treatment, and social integration of those affected.

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